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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/043,709 | 01/09/2002 | Kuo-Yu Chou | 67,200-603 | 6454 |

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EXAMINER

LE, THAO X

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2814

DATE MAILED: 09/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/043,709

Applicant(s)

CHOU ET AL.

Examiner

Thao X Le

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 13-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-12, drawn to a method of making a semiconductor device, classified in class 438, subclass 612.
- II. Claims 13-24, drawn to an apparatus of making a semiconductor device, classified in class 257, subclass 459, 676 and 786.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product. The apparatus as claim is not limited in making a single metal layer, but it can be used to make multi metal layers bond pad.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

3. During a telephone conversation with the Applicant Attorney, Mr. Randy Tung, on 25 June 02, a provisional election was made WITH traverse to prosecute the invention of Group I,

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claims 1-12. Affirmation of this election must be made by applicant in replying to this Office action. Claim 13-14 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 'arrow 12' [0025], Fig. 14 and Fig. 4 [0029]. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the

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invention. Recited 'further comprises the step of: configuring said wiring bond pad as a single metal layer wiring bond pad' is unclear.

8. Claim 7 recites the limitation "the method of claim 6 said metal-8 layer" in claim 7.

There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

10. Claims 1, 8-9 and 11-12 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6417088 to Ho et al.

Regarding to claim 1, Ho discloses a method for forming a wiring bond pad utilized in wire bonding operation on an integrated circuit device comprising the steps of: configuring a wiring bond pad 30, fig. 1, to comprise a single metal layer, and positioning at least one integrated circuit device 10 below wiring bond pad to thereby conserve integrated circuit space and improve wiring bond pad efficiency as a result of configuring wiring bond pad as single metal layer wiring bond pad.

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Regarding to claims 8 and 11, Ho discloses a method for forming a wiring bond pad wherein the single metal layer 30 comprises a copper layer, column 3 line 28, having a thickness of approximately 10KA°, column 3 line 47.

Regarding to claim 9, Ho discloses a method for forming a wiring bond pad further comprising the steps of forming a layer of aluminum film 52, column 4 line 1, above single metal layer 30

Regarding to claim 12, Ho discloses a method for forming a wiring bond pad wherein the layer of aluminum film 52 above single metal layer comprises a buffer 52 and bonding layer 60.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 3-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6417088 to Ho et al. in view of US 6198170 to Zhao.

Regarding to claims 3, 4, and 6, Ho discloses a method for forming a wiring bond pad wherein the single metal layer is located above a single inter-metal dielectric (IMD) layer 20 further comprising the step of locating at least one integrated circuit device 10 below the IMD layer 20.

But he does not expressly disclose the single metal layer 30 is located above a plurality of IMD layers.

However, Zhao reference discloses the single metal layer 410 is located above a plurality of IMD layers (low-k dielectric material) 422, 420, 418, 416, and 414, fig. 4 column 14 lines 25-45 and the fabrication process can be repeated, column 10 line 30-33. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to combine the plurality IMD layers teaching of Zhao with Ho bonding pad method, because it would have increased thermal conductivity and bonding pad and results in a stronger electrical connection between bond wires and bonding pad as taught by Zhao, column 15 line 1-6.

Regarding to claims 5 and 7, Ho discloses a method for forming a wiring bond pad wherein the single metal layer 30 comprises a copper layer, column 3 line 28 (the Examiner assume the claim 5 depends on claim 5).

Regarding to claim 10, Ho does not expressly disclose the aluminum (Al) film 30 having the thickness in the range of 10KÅ° to 20KÅ°

But Ho discloses a method for forming a wiring bond pad wherein the layer of Al film 30 form above single metal layer having a thickness in a range of 5,000 Å°, column 4 line 35. Accordingly, it would have been obvious to use Al thickness teaching of Ho in the range as claimed, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

Conclusion

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13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


- a. US 6378759
- b. US 6376353
- c. US Pub 2001/0000416

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X Le whose telephone number is 703-306-0208. The examiner can normally be reached on M-T from 7:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Thao X. Le
August 21, 2002


PHAT X. CAO
PRIMARY EXAMINER